



**MITIGATING
ANIMAL DISEASE
TO SUPPORT
GROWTH**

V. Mitigating animal disease to support growth

Pakistan's prospects for export of meat and other livestock products depend on effective animal disease management. Livestock contributes more than half of agriculture GDP and one-eighth of national GDP. It is also the leading driver of growth in the agriculture sector. Therefore, at the domestic level, outbreaks of animal disease have consequences for the supply of meat, milk, and other livestock products, price levels of these products, and the need to expend foreign reserves to import vaccines. But the major prospect of livestock-based exports is heavily constrained by the current disease management regime in Pakistan. This chapter first illustrates the state of disease management through a case study of the recent lumpy skin disease outbreak and then presents how a path to livestock exports can be achieved through better surveillance, disease-free zones, vaccines, farmer awareness, and greater involvement of the private sector.

Case study of disease management: outbreak of lumpy skin disease in Pakistan

The most common animal diseases in Pakistan are: foot and mouth disease in cows and buffaloes, PDPR in goats and sheep, and avian influenza in poultry (Annex E). But Pakistan's recent experience with the lumpy skin disease in 2021-22 has important lessons for how a slow government response and lack of awareness caused a national emergency and culminated in significant economic loss.

The lumpy skin disease outbreak was first detected in Sindh province in November, 2021. Pakistan's response to the disease was slow leading to higher mortality and morbidity rates. The disease spread more rapidly in Sindh and some parts of Punjab. Outbreaks had been observed in India, Bangladesh, and China in 2019. In 2020, outbreaks were witnessed in other Asian countries including Bhutan, Myanmar, Nepal, Taiwan, Vietnam and Sri Lanka. It was just a matter of time before the disease would have appeared in Pakistan. But Pakistan seemed to have been caught off-guard. Cattle holders had little knowledge on the SOPs to be followed in case the signs of lumpy skin disease are spotted. The disease was only notified by the government on March 4, 2022.

In March 2022, the Ministry of National Food Security and Research set up a task force to develop a framework for controlling the outbreak in March 2022. A ban on the livestock markets was imposed to prevent its spread. Special teams were sent to dairy farms to vaccinate cattle against the viral disease. Awareness was raised about the disease and about prevention methods by the government. Sindh government also aims to develop its own vaccine (GAVI, 2022).

Table 1 highlights the extent of damage caused by the lumpy skin disease outbreak of 2021-22 in Pakistan. Like Covid-19, a sizable portion of the disease's impact may have gone undetected due to lack of reporting, reporting errors, and lack of signs appearing on cattle due to strong animal immunity. Moreover, table 1 does not reflect the effect lumpy skin disease had on consumer choices and on the price of meat. The demand of livestock meat including cows, goats, and sheep declined resulting in increased prices of broiler chicken causing additional burden on the masses. The political fall-out was also palpable. At one point, the Meat Merchant Welfare Association protested at Karachi Press Club to demand the local government to lift the ban on cattle markets.

Table 1: Lumpy skin disease in Pakistan

Impact of outbreak in 2021-22
190,000 cattle infected
7,500 cow deaths
33% morbidity rate
3.9% mortality rate
4+ mn of vaccine import
5 million dairy farmers & meat sellers suffered

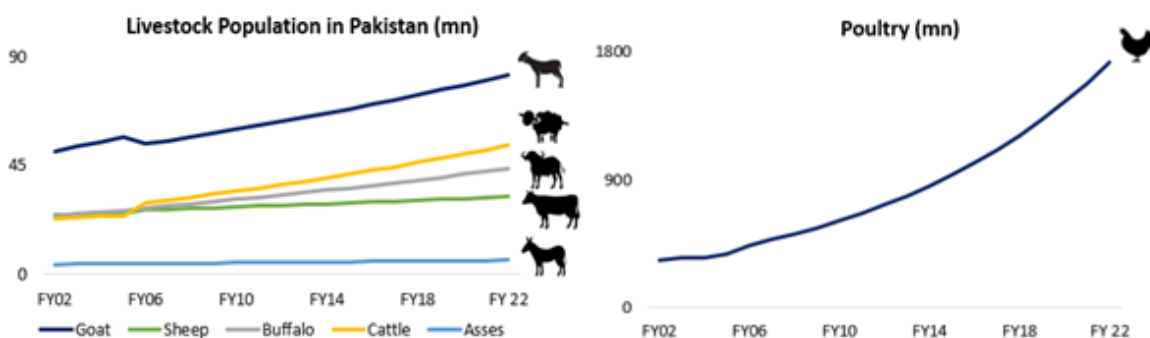
Source: Global Alliance on Vaccines and Immunization (GAVI)

There are some obvious lessons from this case study. If the government had sprung to action earlier and taken the measures that it took later, more animals could have been protected and economic loss could have been curtailed. Livestock disease management requires a national approach in coordination with provincial systems to control outbreaks efficiently. Livestock disease management requires awareness on animal disease management at the lowest level to avoid future outbreaks!

The contradiction in regulation: over-regulate the formal few, ignore the rest

The Government of Pakistan estimates a consistent rise in livestock populations over the past two decades. The growth in poultry overshadows the number and leads the growth rate compared to all other types of animals. The numbers for the poultry population can be considered more reliable given that 95 percent of Pakistan's poultry grows in commercial operations most of which are likely to be registered with the government. But the rest of the animal population is mostly in the informal sector with only a sliver of the population growing in formal sector farms.

Figure 29: Livestock has been rising with poultry dominating by number



Source: Economic Survey of Pakistan (various editions)

Milk is a critical livestock product with great prospects for growth—it is sometimes labelled ‘white gold’ in Pakistan. The major challenge for Pakistan’s livestock sector is that the ownership of livestock is dominated by rural families and small farmers. (Rehman et al., 2017; Tahir et al., 2019). It is estimated that about 80 percent of milk-producing animals are owned by ‘backyard farmers’ of 1-10 animals of which the highest proportion is families with 2-5 animals. These animals are cared for by a family member typically with little or no education plus only traditional methods of animal care. On the other end of the spectrum, there are over 50 large ‘corporate’ dairy farms in Pakistan with large herds of imported animals. But they contribute only a few percent of the milk produced in the country. It is believed in trade circles that, in between these extremes, there are a few thousand dairy farms with herd sizes of 50-200 domestic animals.

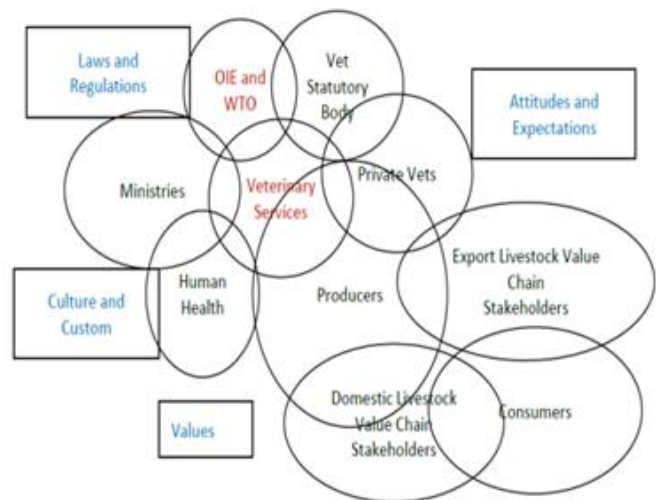
This sector structure gives root to a contradiction in the way the livestock sector is regulated. Those who choose to operate in the formal sector are subjected to severe over-regulation akin to developed countries. By contrast, the vast majority of the sector’s players who operate in the informal sector are under-regulated. This pattern is reflected in the implementation of the disease management regime as well whereby the highest standards are expected of the formal sector dairy farms while the vast majority of animals are in the care of unregulated dairy farmers.

Mapping the stakeholders

Figure 30 presents the web of stakeholders that should typically be incorporated into animal disease management efforts for it to function efficiently. At the center are the growers/producers but their composition varies. The growers in the poultry sector are predominantly commercial players while the growers in the dairy sector are predominantly rural families.

The government’s policy role is executed by the federal Ministry for National Food Security and Research (with linkages to the World Trade Organization and the World Organization for Animal Health, formerly OIE) as well as each province’s relevant department titled ‘livestock and dairy development’ in Punjab, ‘livestock and fisheries’ in Sindh, etc. The government’s regulatory role is typically also executed by the same departments. Since agriculture is a subject devolved to the provinces, these provincial departments provide the veterinary services to growers—although their footprint is extremely limited given the scale of the sector and the resources available to these departments. Private vets exist but their footprint is also limited relative to the need.

Figure 30: Disease management: Stakeholders, key factors



Source: World Organization for Animal Health

The domestic livestock value chain includes aggregators of livestock products, processors, suppliers of livestock inputs to growers, wholesale market players, and retail level sellers. There is a small export community dealing in livestock exports.

The work of all these stakeholders is influenced by attitudes and expectations prevailing in the sector, many of which can be from another era of livestock development when government took the lead in all activities. The values, culture and customs also impact outcomes on disease management. In this context, when a national level response is required during a disease outbreak, coordination among this panoply of stakeholders is required.

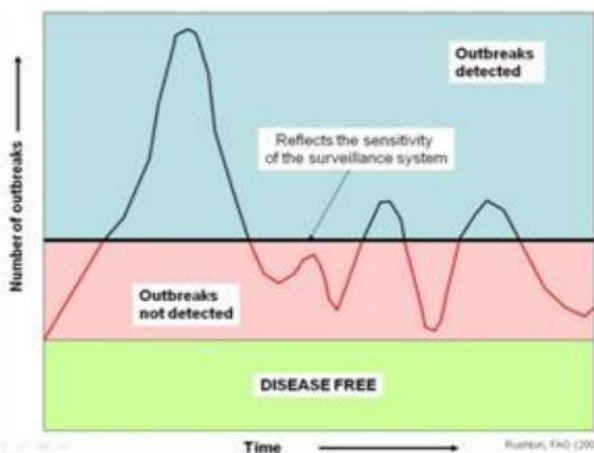
Surveillance

Surveillance systems are the key pillar of disease management. Figure 31 illustrates that the sensitivity of the surveillance system determines the time a disease outbreak spends undetected. Outside of disease-free zones, a reasonably sensitive surveillance system typically detects a large number of diseases soon after an outbreak takes place (tallest peak). But other diseases may only be detected much later (smaller peaks).

Surveillance systems hinge on the concept of notifiable diseases—those which the public is legally obliged to report to the authorities. But growers cannot themselves control viral diseases. So, it is not sufficient for the authorities to simply be informed on outbreaks of notifiable diseases. The effective measures to be taken are to remove the infected animals and give compensation to the growers for this removal as well as the clean-up and disinfection.

In Pakistan, the formal surveillance system for animal disease outbreaks is inside the public sector. Currently, the role of private sector in animal disease management is negligible. Among public sector surveillance systems, the Government of Punjab's surveillance system merits mention. Each District Animal Disease Investigation Officer (ADIO) is required to submit a Monthly Notifiable Disease Report by post or email. Data is then manually entered in Lahore. But not all districts provide regular, monthly reports because of reasons that generally ought to be easy to address. District Officers may fear reprisal for not having effectively prevented the disease in the first place. Or the travel allowance for surveillance across the district may be too low with no additional provision for fuel.

Figure 31: Tracking outbreaks



Source: *Animal disease management, Livestock and Dairy Development Department, Government of Punjab (2012)*

The inevitable result of under-reporting from the field is that central level epidemiologists receive an incomplete picture of the disease situation because the sensitivity of reporting is sub-optimal. The private sector's role is mostly limited to private livestock holdings only. However, there is room for private sector engagement for better animal disease management.

Broadly, the SOPs exist and range from detection, investigation, process management and control. Even though the SOPs are comprehensive and cover every aspect of the disease response, there is a lot of room for improvement in implementation. Greater engagement with the private sector, simplification of processes through automation, and better engagement of large numbers of growers through technology is required.

Animal disease management faces greater difficulty because the livestock sector is even more skewed towards the rural areas than human population is. Therefore, frequent reporting from remote areas remains a big gap in the overall surveillance process. The general SOPs to stop outbreaks and check transmission are: controlled introduction of animals into existing herds, regular cleaning and disinfection of livestock areas, monitoring and reporting of illness, and use of effective vaccination strategies.

Disease-free zones

Lack of exports of livestock and livestock products is attributed to the absence of disease-free zones in the country, especially, foot-and-mouth disease free zones. Creating disease-free zones and compartmentalization of disease outbreaks are procedures implemented for the purpose of disease control and/or protecting international trade. A zone is a clearly defined part of a country, with (a) a distinct animal sub-population, (b) animals having a distinct health status with respect to a specific disease, and (c) surveillance, control and biosecurity measures that are required for the purpose of international trade. A compartment has the same characteristics but only comprises one or more premises in which animals are kept.

Zoning and compartmentalization can enable a staged approach to disease control, with resources concentrated where they have most effect. The strategy can enable export once the agreed target of disease control or eradication has been reached. But practically, the compliance requirements set by the World Organization for Animal Health are demanding. A disease-free zone has high maintenance costs for retaining the disease-free status. It requires maintenance of a continuous surveillance system preventing the introduction of the pathogen through revised imports and border controls. It also involves appointing additional personnel and controlling the movements of animals and animal products.

The Government of Punjab's Livestock and Dairy Development Department prescribes how disease-free zones can be developed. The process starts with the identification and announcement of proposed area. The notification of the area is done in communication the World Organization for Animal Health. Both the holders of livestock and the animals have to be identified and registered.

Awareness activities are conducted for the farmers of the area on the advantages of disease-free zones/ compartments. Broadly, models are established for animal fattening and production through breeding. Quarantine camps and laboratories are set up at entry and exit points. Vaccinations against notifiable diseases, e.g., foot-and-mouth disease, are ensured. Finally, intensified disease surveillance and reporting are commenced.

The development of disease-free zones should ideally be coordinated with private sector investment in export-oriented slaughterhouses and meat processing plants. This necessitates the regular provision of best treatment and diagnostic facilities in the area and the enforcement of a legal framework for control of animal movement on entry and exit points. Regular surveillance and reporting of disease as well as data sharing with the relevant national and international agencies becomes critical.

Pakistan needs to expand vaccination with a path to domestic production of vaccines

Controlling animal diseases with vaccination presents great potential for a stronger linkage of Pakistan's livestock sector to the international export market. Without disease-free certification, this potential cannot be reached. Improvement in the production, efficacy, and utilization of animal vaccines is an important complement to the development of disease-free zones. But there is a great of distance to cover on these important goals.

Pakistan's livestock herd requires the production of over 200 million good quality vaccine doses per annum to achieve an 85 percent vaccination rate—the target rate for herd immunity (FAO 2014). Current production is lacking in quantity and is perceived to be of lower quality. Some 95 percent of locally produced animal vaccines in Pakistan are developed in six public sector research institutions, while the role of private industry is minimal (Khattak 2019). The quality and quantity of vaccines produced in these research institutions is not sufficient for the annual vaccination requirements of livestock, requiring vaccines to be imported. An estimated US\$ 45.5 million was spent in 2019 on importing animal vaccines (World Integrated Trade Solution). Increasing local vaccine production is imperative given the global scenario and constant rupee devaluation to keep animal care affordable.

Foot and Mouth Disease is a reoccurring issue in Pakistan with biannual outbreaks occurring all over the country but most commonly in the Landhi Dairy Colony in Sindh. In the Landhi Dairy Colony, 88 percent of all farmers are using vaccines on their animals, but only when the animal first enters the herd or when the animal is already symptomatic. The good practice to prevent constant outbreak is that farmers should be vaccinating all their animals twice a year: before the beginning of rainy seasons in June and September (Klein et al. 2008). The FAO has introduced cost sharing in their foot and mouth disease vaccination program for new enrollees as dairy farmers near to Karachi had seen the efficacy of the program vaccine (FAO 2014). This has expanded vaccination coverage.

Animal vaccine production is crucial to support the growth of livestock products and ensures the economic sustainability of this important sector. Production and distribution of quality vaccines requires effective disease surveillance, independent vaccine quality control, and appropriate cool chains to maintain vaccine quality during transport and application. Pakistan needs vaccine accessibility and friendly policies to incentivize local manufacturers to produce it. China has signed MoUs with local industry for producing Chinese vaccines in Pakistan (Daily Times, 2022). Supporting local industry production of these vaccines through partnerships is an untapped avenue to improve the quality of local vaccination.

Conclusions and policy priorities

For Pakistan to gain access to high-end export markets, upgrading animal disease management is critical. Livestock is the main driver of growth in Pakistan's agriculture sector. Much greater growth can be achieved by accessing export markets for livestock and livestock products. But a significant jump in these exports will remain elusive until Pakistan addresses animal disease management. Animal disease management is a priority for domestic consumption of livestock products as well. This paper has highlighted better surveillance, management of disease outbreaks, farmer awareness, vaccine accessibility and production, setting up disease free zones, and private sector involvement in disease management for realizing the potential.

Surveillance and reporting must be strengthened and coordinated nationally and internationally. Modern disease surveillance involves provision of global positioning systems (GPS) based devices to Animal Disease Investigation Officers so they can identify and report coordinates of disease outbreak sites. Farmers must be encouraged to report specific diseases of concern by integrating surveillance with extension, informing farmers what to report and to whom/how. Sampling surveys must be designed according to the requirements demonstrating disease freedom in the planned disease-free zones and vaccination coverage.

Disease reporting officers must be incentivized to report diseases for early detection and rapid response rather than living in fear of reprimand upon finding disease. Early disease notifications are quintessential in decreasing the mortality and morbidity rates. Reporting outbreaks of animal diseases serves the greater good of the global animal health community. Government functionaries at the local level should not have to worry about the negative publicity associated with such outbreaks. The incentives at all levels should be associated with such reporting. Regular disease reporting from abattoirs must be established with veterinary meat inspectors, and field laboratories should be made more functional and laboratory test results better integrated with disease reports from the field.

Coordinated oversight of outbreaks: Government's response to lumpy skin disease seemed slow and weak initially until it developed a national level task force to deal with it. Oversight at the federal level with active participation from all provinces would have been a better way to respond to the outbreak

from the onset. Building upon the experience from lumpy skin disease and Covid-19, a national control and command center should automatically become active in case of an animal disease outbreak with participation of all relevant stakeholders in it. All provinces should know their roles and responsibilities and should adhere to the regulations set out at the national level.

Disease free zones: The compliance can be a bit costly but so are the returns. Disease free zones can open up avenues to export livestock and livestock products to high end markets across the globe. Pakistan should start with small disease-free zones linked to investment in export-oriented projects. This must be used as a springboard for consistently expanding disease-free areas across Pakistan in a phased manner.

Building awareness. It is critical to invest in disease awareness among small cattle holders who are at the frontline of animal disease outbreak. Farmers should be trained to identify and report on specific diseases of concern. Government should start developing a repository of cattle owners with their contact numbers and constantly inform them on various disease outbreaks in the world and the signs that they should watch for in their livestock through recorded phone calls. The calls should also guide them on not vaccinating their livestock without consulting a qualified veterinarian. The call should also guide them on how to report signs of disease in their livestock.

Involvement of the private sector: The traditional approach to disease management has been that it is only government and its functionaries which can operate this regime. Given the scale of the challenge, government resources can be supplemented with the involvement of the private sector in three main areas. The first area is private service providers to farmers funded by the government. In fact, the government can pilot a private curative service delivery system in one or more districts. The second area is the involvement of processors of livestock products who are connected with livestock farmers. Many programs along this theme already exist. For example, Friesland Campina Engro has a program in Sindh under which women are trained to provide veterinary services in their own local areas to livestock farmers. This provides a stream of income to women while providing a great benefit to farmers and processors alike. Some of these women have turned a dedicated room in their houses into a warehouse to become a supplier of associated inputs. The third area where the private sector can become involved is community-based animal health care. A large number of livestock owners are unable to access private services due to the long distances and cost of getting their livestock checked by private practitioners. For this purpose, community-based animal health care can be established in areas where professional veterinarians are unwilling to work due to low remuneration.